

3/29/06

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

AKERMAN SENTERFITT, P.A.

**PCT**

NOTIFICATION OF TRANSMITTAL OF  
INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(Chapter II of the Patent Cooperation Treaty)

(PCT Rule 71.1)

Date of mailing  
(day/month/year)

13 FEB 2006

Applicant's or agent's file reference

7230-20WO

**IMPORTANT NOTIFICATION**

International application No.

PCT/US04/36212

International filing date (day/month/year)

29 October 2004 (29.10.2004)

Priority date (day/month/year)

29 October 2003 (29.10.2003)

Applicant

UNIVERSITY OF MIAMI

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the *PCT Applicant's Guide*.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

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# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 7230-20WO	<b>FOR FURTHER ACTION</b>	See Form PCT/IPEA/416																								
International application No. PCT/US04/36212	International filing date (day/month/year) 29 October 2004 (29.10.2004)	Priority date (day/month/year) 29 October 2003 (29.10.2003)																								
International Patent Classification (IPC) or national classification and IPC IPC(7): C02F 1/30 and US Cl.: 210/695																										
Applicant UNIVERSITY OF MIAMI																										
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p style="margin-left: 20px;">a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>3</u> sheets, as follows:</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p style="margin-left: 20px;">b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>																										
<p>4. This report contains indications relating to the following items:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 10%; text-align: center;"><input checked="" type="checkbox"/></td> <td style="width: 20%;">Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>			<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input type="checkbox"/>	Box No. VII	Certain defects in the international application	<input type="checkbox"/>	Box No. VIII	Certain observations on the international application
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Date of submission of the demand 23 August 2005 (23.08.2005)	Date of completion of this report 27 January 2006 (27.01.2006)																									
Name and mailing address of the IPEA/ US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Authorized officer Peter A. Hruskoci DEBORAH A. THOMAS PARALEGAL SPECIALIST Telephone No. 571-272-0987																									

# INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/US04/36212

## Box No. I Basis of the report

1. With regard to the language, this report is based on:

- ☒ the international application in the language in which it was filed.
- ☐ a translation of the international application into English, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
- ☐ publication of the international application (under Rule 12.4(a))
- ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-28 as originally filed/furnished
- pages\* NONE received by this Authority on \_\_\_\_\_
- pages\* NONE received by this Authority on \_\_\_\_\_
- ☒ the claims:
- pages NONE as originally filed/furnished
- pages\* NONE as amended (together with any statement) under Article 19
- pages\* NONE received by this Authority on \_\_\_\_\_
- pages\* 29-31 received by this Authority on 23 August 2005 (23.08.2005)
- ☒ the drawings:
- pages 1-16 as originally filed/furnished
- pages\* NONE received by this Authority on \_\_\_\_\_
- pages\* NONE received by this Authority on \_\_\_\_\_
- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

International application No.  
PCT/US04/36212

**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Claims <u>1-13, 15, 16, and 19</u>	YES
	Claims <u>14, 17, and 18</u>	NO
Inventive Step (IS)	Claims <u>NONE</u>	YES
	Claims <u>1-19</u>	NO
Industrial Applicability (IA)	Claims <u>1-19</u>	YES
	Claims <u>NONE</u>	NO

**2. Citations and Explanations (Rule 70.7)**

## Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

**V. 2. Citations and Explanations:**

Claims 14, 17, and 18 lack novelty under PCT Article 33(2) as being anticipated by Matsumoto et al. 3,461,067. It is submitted that Matsumoto et al. disclose (see col. 1 line 60 through col. 3 line 58) the system structure as recited in the instant claims.

Claim 15 lacks an inventive step under PCT Article 33(3) as being obvious over Matsumoto et al. as above, in view of Miller et al. 6,177,016. The claim differs from Matsumoto et al. as applied above by reciting that the reaction chamber is a fluidized bed. Miller et al. disclose (see col. 3 line 9 through col. 5 line 67) that it is known the art to utilize a fluidized bed of iron particles, to aid in removing contaminants from water. It would have been obvious to one skilled in the art to modify the system of Matsumoto et al. by utilizing the recited fluidized bed in view of the teachings of Miller et al., to aid in reducing the concentration of contaminants in the water.

Claims 16 and 19 lack an inventive step under PCT Article 33(3) as being obvious over Matsumoto et al. as above, in view of Gurol et al. 6,531,065. The claims differ from the references as applied above by reciting that the system comprises a magnetic field source or an ultraviolet source. Gurol et al. disclose (see col. 4 line 23 through col. 7 line 50) that it is known the art to utilize ultraviolet light and an iron source, to aid in removing perchlorate from water. Gurol et al. further teach the use of a magnetic field to assist the removal of iron metal from the water. It would have been obvious to one skilled in the art to modify the system of Matsumoto et al. by utilizing the recited ultraviolet and magnetic field sources in view of the teachings of Gurol et al., to aid in reducing the concentration of contaminants and iron metal in the water.

Claims 1-4 and 8-12 lack an inventive step under PCT Article 33(3) as being obvious over Matsumoto et al. in view of Pommier 5,599,372. The claims differ from Matsumoto et al. as applied above by reciting that the influent water includes chelated metal formed by contacting soil or sediment with a chelating agent such as EDTA. Pommier disclose (see col. 4 line 26 through col. 8 line 63) that it is known the art to utilize EDTA to remove metals from soil, and to recover metals from an aqueous phase containing EDTA by precipitation and flocculation. It would have been obvious to one skilled in the art to utilize the method Matsumoto et al. to treat the recited influent water in view of the teachings of Pommier, to aid in reducing the concentration of contaminants in the water.

Claim 5 lacks an inventive step under PCT Article 33(3) as being obvious over Matsumoto et al. and Pommier as above, and further in view of Gurol et al. 6,531,065. The claim differs from the references as applied above by reciting that the contacting step includes ultraviolet radiation. Gurol et al. disclose (see col. 4 line 23 through col. 7 line 50) that it is known the art to utilize ultraviolet light and

## Supplemental Box

an iron source, to aid in removing perchlorate from water. It would have been obvious to one skilled in the art to modify the references as applied above, by utilizing the recited ultraviolet radiation in view of the teachings of Gurol et al., to aid in reducing the concentration of contaminants and iron metal in the water.

Claim 6 lacks an inventive step under PCT Article 33(3) as being obvious over Matsumoto et al. and Pommier as above, in view of Miller et al. 6,177,016. The claim differs from the references as applied above by reciting that the method is performed in a fluidized bed. Miller et al. disclose (see col. 3 line 9 through col. 5 line 67) that it is known the art to utilize a fluidized bed of iron particles, to aid in removing contaminants from water. It would have been obvious to one skilled in the art to modify the references as applied above by utilizing the recited fluidized bed in view of the teachings of Miller et al., to aid in reducing the concentration of contaminants in the water.

Claim 7 lacks an inventive step under PCT Article 33(3) as being obvious over Matsumoto et al. in view of Pommier and Miller et al. as above, and further in view of Oeste 5,480,524. The claim differs from the references as applied above by reciting that the method comprises magnetically-controlled fluidizing. Oeste disclose (see col. 2 line 58 through col. 4 line 50) that it is known the art to utilize a magnetic flux to aid in rearranging particles in a fluidized bed for degrading contaminants. It would have been obvious to one skilled in the art to modify the references as applied above by utilizing the recited magnetically-controlled fluidizing in view of the teachings of Oeste, to aid in rearranging particles in the fluidized bed.

Claim 13 lacks an inventive step under PCT Article 33(3) as being obvious over Matsumoto et al. and Pommier as above, in view of Sivavec 5,750,036. The claim differs from the references as applied above by reciting that the contacting step includes iron-reducing bacteria for reducing Fe<sup>+3</sup> to Fe<sup>+2</sup>. Sivavec disclose (see col. 2 lines 55-67) that it is known the art to introduce ferrous ion into contaminated soils or sediments by dissolution of ferrous ions produced by the growth of iron-reducing bacteria. It would have been obvious to one skilled in the art to utilize the references as applied above by including the recited bacteria in the contacting step in view of the teachings of Sivavec, to aid in introducing ferrous ions into the water.

Claims 1-13, 15, 16, and 19 meet the criteria set out in PCT Article 33(2), because the prior art does not disclose the method steps and structure of the system recited in the instant claims, respectively.

Claims 1-19 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry to remove contaminants from water.